DOCUMENT RESUME

ED 028 834 PS 001 790

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A Theoretical Approach for Selecting Elementary School Environmental Variables.
Massachusetts Univ., Amherst. School of Education.
Pub Date [69]
Note-13p.
EDRS Price MF-$0.25 HC-$0.75
Descriptors-*Achievement, *Educational Environment, Elementary Schools, Environmental Influences, *Individual Characteristics, *Intelligence, Language Development, Learning Experience, *Measurement Techniques, Models, Motivation

To determine specific environmental variables of the elementary school is the purpose of this study. Stable characteristics of intelligence and achievement were selected because they were considered useful for generating salient environmental counterparts likely to exist in elementary institutions. Achievement motivation, language development, and general learning were three environmental variables considered to be counterparts of intelligence. Counterparts of achievement were achievement press, language models, academic guidance, activeness of the school, intellectuality in the school, and work habits in the school. C. Robert Pace's variables (practicality, community, awareness, propriety, and scholarship) are dimensions which describe the elementary environment and they were included with the seven environmental counterparts (for developing intelligence and achievement) which were considered in this investigation. (DO)

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A Theoretical Approach for Selecting Elementary School Environmental Variables

By

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One of the most significant decisions to make in an environmental study is that of determining the environmental variables to be measured. Theory and research, at present, are not explicit enough to prescribe what ought to be studied about environments. For example, theories of learning and behavior acknowledge the influence of environment on the development of human characteristics, but there is no accordant attention given to the identification of compelling environmental variables. The few existing environmental measures usually assess very general variables. Social rank, socio-economic level, and occupational and educational level of parents are examples of such gross environmental aspects. These measures are so broad that they undoubtably obscure many important differences among environments. The present study will use more specific variables to describe the diversity of elementary school environments.

Anastasi,[1] Bayley,[2] Bloom,[3] and others suggest that precise environmental indices can be generated by viewing environment in relation to

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1 Anne Anastasi, "Heredity, Environment and the Question 'How?'" Psychological Review, 65 (1958), pp.196-207.

2 Nancy Bayley, "A New Look at the Curve of Intelligence," Proceedings of the 1956 Invitational Conference on Testing Problems (Princeton: Educational Testing Services, 1965), pp.11-25.

3 Benjamin Bloom, Stability and Change in Human Characteristics (New York: John Wiley & Sons, Inc. 1964) pp.9-10.

the development of specific behavioral characteristics. The environmental variables to be used for measurement would be those which empirical research suggest are most likely to have some effect on the development of designated individual characteristics. In other words, relevant features of the environment can be identified, first, by selecting individual characteristics likely to be priority considerations of the environment being surveyed and, second, by determining variables which are as close as possible to being environmental counterparts of the selected individual characteristics. The present study uses this two-fold approach to identify environmental variables for measuring elementary school environments.

Selecting Individual Characteristics

The particular individual characteristics selected for producing environmental variables for this study are among those identified by Bloom in his comprehensive investigation of stability and change in human characteristics.[4] Bloom traces the development of human characteristics by examining and interpreting findings in various kinds of longitudinal studies. He inquires into numerous measurements and observations of individuals at different points in their development in order to identify stable characteristics and the changing levels of such characteristics.

Stable characteristics are considered for the present study because they seem important to children's development, and they appear to include behaviors subject to considerable modification by the elementary school environment. Bloom's definition of a stable characteristic supports

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[4] Bloom, op. cit.

this line of thinking. He defines a stable characteristic as "... one that is consistent from one point in time to another."[5] He adds that "... one might further delimit this by specifying the time intervals as one year or more and the minimum level of consistency as a correlations of +50 or higher."[6] In addition to the empirical criteria for stability, Bloom considers theoretical criteria for identifying characteristics that are stable. The criteria are:

> 1. Nonreversibility . . . each change in the characteristic represents an increment added to the growth which has already taken place. Development is, from this point of view, additive and cumulative and a level of development once attained by the individual is not lost.
>
> 2. Negatively accelerated growth . . . characteristics which have negatively accelerated growth rates are most likely to be stable. Such characteristics are also likely to be highly stabilized at an early age. This is little more than saying that if little change takes place in a characteristic after a given age, the characteristic will be stable, and that stability is inversely related to change.
>
> 3. Pervasive and durable . . . stable characteristics are more likely to be based on interactional processes, ways of relating to phenomena, life style, etc. . . . . This is to say that basic mechanisms and processes are most likely to be stable, whereas symptoms and more superficial aspects of an individual's behavior are less likely to be stable.[7]

Two individual characteristics found by Bloom to be clearly stable in relation to the criteria are intelligence and achievement. The present study uses these characteristics to generate environmental

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5 Ibid., p. 3.

6 Ibid.

7 Ibid., pp. 3-5.

variables because intelligence and achievement are stable, receptive to environmental influence, and priority considerations of elementary schooling.

For purposes of the present study, physical characteristics are not considered because generally they are not priority considerations of the elementary school. The research data available for determining the stability of interests, attitudes, and personality are far from satisfactory. Thus, it is difficult to compare research findings with the criteria for stability. Research does show, however, that generally there is no explicit understanding of the stability of interests, attitudes, and other personality characteristics. Also, information reported suggests that these characteristics probably stabilize at a date later than the individual's involvement with the elementary school.[8]

For purposes of the present investigation, intelligence and achievement are considered potentially useful for generating salient environmental counterparts likely to exist in elementary institutions. Therefore, any environmental dimensions that are identified for use in this study are considered important to elementary education because of their possible influence on the development of significant stable characteristics. Because children are exposed to elementary school environments at a time when there is opportunity for considerable modification of individual characteristics, the early educational environment can have a marked effect upon the development of both intelligence and achievement.

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[8] Bloom, op. cit., pp. 132-179.

Environmental Counterparts to Intelligence and Achievement

The influence of environment on the development of children is greatest during the early formative years. Bloom estimates that by age 9, at least 50 per cent of the general learning pattern at age 18 has been developed, and at least 75 per cent of the pattern has been developed by about the age of 13.[9] Thus, the elementary school years appear to be very crucial in determining the educational progress of the later years.

Intelligence

Early enviroment has an effect on the development of intelligence; yet, there is little information about the particular environmental variables likely to foster such development. Thus, at this point in time it is not possible to describe explicitly what constitutes abundant and deprived environments for the development of intelligence. It is feasible, however, to identify some of the dimensions of extreme environments on the basis of research studies that demonstrate intelligence test differences in relation to environmental variables. Following are descriptions of three environmental variables considered to be counterparts to the intelligence characteristic:[10]

1. Achievement Motivation--The nature of the intellectual expectations of the child and

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9 Bloom, op. cit., p 105.

10 The variables and their descriptions are adapted from those identified by Wolf in his comprehensive review of the literature on the effects of environments on intelligence. (Richard M. Wolf, "The Identification and Measurement of Environment Process Variables Related to Intelligence", unpublished Ph. D. dissertation, University of Chicago, 1963).

aspirations for the child contribute to this press. Further, the amount of information about a child's intellectual development, and the nature of rewards for intellectual accomplishment play a part in this dimension.

2. Language Development--This environmental antecedent is characterized by opportunities that encourage the use of language. The development of language is fostered by attention to opportunities for increasing vocabulary and for using verbal ability in a variety of situations. The emphasis on correctness of language usage and the quality of language models available to the student also contribute to this variable.

3. General Learning--This environmental dimension is best described as having an emphasis on providing opportunities for learning in the school and outside the school. The atmosphere encourages direct contact and interaction with the surrounding world and with the experiences represented by books, periodicals, pictures, and other such media. Not only are students encouraged to use library facilities and learning supplies, but there is a concentrated effort on having such things

available. This variable can be characterized by the nature and amount of assistance provided to facilitate learning in a variety of situations.

Achievement

The individual characteristic of achievement, like intelligence, is influenced by early environment, but again the particular nature of the environment is not explicitly defined. Yet, it is conceivable that measured differences in achievement are related to the following six environmental antecedents:[11]

1. Achievement Press--Teacher aspirations for the education of the student, and the teacher's own aspirations and interest in academic achievement contribute to the achievement press. The social emphasis for academic achievement and the standards of rewards for educational attainment also are part of this variable. Further characterization of this dimension includes the concern for knowledge of the educational progress of the child, and the preparation and planning for the attainment of educational goals.

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11 The variables and their descriptions are adapted from those identified by Dave in his comprehensive review of the literature on the effects of environments on achievement. (Ravindrakumar H. Dave, "The Identification and Measurement of Environmental Process Variables that are Related to Educational Achievement" unpublished Ph. D. dissertation, University of Chicago, 1963).

2. Language Models--The quality of the language usage of the teachers, the opportunities for the enlargement and use of vocabulary and sentence patterns, and the alertness of the teachers for correct and effective usage contribute to the environment that stresses language.
3. Academic Guidance--The availability and quality of guidance on matters relevant to school work, and the availability and use of materials and facilities related to school learning are important to this environment.
4. Activeness of the School--This environmental variable is best described by the extent and content of indoor and outdoor activities of the school. An emphasis on the use of television, films, books, periodical literature, and other facilities of the library is also apparent.
5. Intellectuality in the School--The nature and quality of toys, games, and hobbies made available to the child, and the opportunities for thinking and imagination in daily activities are characteristics of this environment.

6. Work Habits in the School--This environmental dimension includes the degree of structure and routine in the school and classroom management. The amount of preference for educational activities over other pleasurable encounters is another element of this environment.

The two lists of environmental variables display considerable overlap between the antecedents of intelligence and achievement. This is largely a reflection of the similarity between the two individual characteristics. Kelley finds that correlations between intelligence test scores and achievement test scores are significantly high.[12] Coleman and Cureton, in a study of the same problem, find almost identical results.[13] This high relationship between the characteristics raises serious question about the separateness of intelligence and achievement. Also, it offers an explanation for the overlap between the environmental counterparts.

Relationship of Environmental Counterparts to Pace's Environmental Variables

The environmental counterparts for both intelligence and achievement seem similar to the five scales used by Pace in his studies of college and university environments. Pace's research indicates that institutions of higher education differ considerably from one another when measured along the environmental variables labeled Practicality, Community,

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12 T. L. Kelley, Interpretation of Educational Measurement (New York: World Book Co., 1927).

13 Coleman and E. E. Cureton, Intelligence and Achievement: The "Jangle Fallacy" Again. Education and Psychology Measurement, 14 (1954), pp. 347-351.

Awareness, Propriety, and Scholarship.[14] The similarity of these variables to the environmental counterparts for intelligence and achievement, and thus their importance and relationship to elementary schools are manifest in the following descriptions:[15]

1. Practicality--The statements in this variable suggest a practical, instrumental emphasis in the environment. Procedures, personal status, and practical benefits are important. Status is gained by knowing the right people, being in the right groups, and doing what is expected. Order and supervision are characteristic of the administration and of the classwork. Good fun, school spirit, and student leadership in school social activities are evident.

2. Community--A friendly, cohesive, group-oriented school life is characterized by the combination of statements in this dimension. The environment is supportive and sympathetic. There is a feeling of group welfare and group loyalty which encompasses the school as a whole. The school is a community. It has a congenial atmosphere.

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14 C. Robert Pace, College and University Environment Scales: Technical Manual (Princeton: Educational Testing Services, 1965) pp. 24-25.

15 The descriptions are adapted from Pace's definition of the variables. C. Robert Pace, College and University Environment Scales: Technical Manual (Princeton: Educational Testing Services, 1963), pp. 24-25.

3. Awareness--The items in this variable seem to reflect a concern and emphasis upon three sorts of meaning--personal, poetic, and political. An emphasis upon self-understanding, reflectiveness, and identity suggest the search for personal meaning. A wide range of opportunities for creative and appreciative relationships to painting, music, drama, poetry, sculpture, and architecture suggests the search for poetic meaning. A concern about events around the world, the welfare of mankind, and the present and future condition of man suggests the search for political meaning and idealistic commitment. What seems to be evident in this sort of environment is a stress on awareness--an awareness of self, of society, and of esthetic stimuli.

4. Propriety--An environment that is polite and considerate is suggested by the statements in this dimension. Caution and thoughtfulness are evident. Group standards of decorum are important. On the negative side, one can describe propriety as the absence of demonstrative, assertive, rebellious, risk-taking, inconsiderate behavior.

5. Scholarship--The items in this variable describe an academic, scholarly environment. The emphasis is upon competitively high academic achievement and a serious interest in scholarship. The pursuit of knowledge and theories, scientific or philosophical, is carried on rigorously and vigorously.

> Intellectual speculation, an interest in ideas as ideas, knowledge for its own sake, and intellectual discipline--all these are characteristic of the environment.

The seven environmental counterparts for developing intelligence and achievement and Pace's five variables described above can be related in a two dimensional paradigm. For an illustration of the paradigm see Figure 1.

This paradigm suggests that each environmental counterpart to intelligence and achievement relates in some way to one or more of Pace's variables. In simple terms, the paradigm shows that Practicality, Community, Awareness, Propriety, and Scholarship are indeed appropriate dimensions for describing some of the reality that exists in elementary institutions. Therefore, because of their appropriateness and significance, the five variables developed by Pace are used in the present investigation to measure the educational environment of designated elementary schools.

FIGURE 1

Paradigm of Environmental Variables

Stable Characteristics Environmental Counterparts		Pace's Variables				
		Pract.	Comm.	Awar.	Prop.	Schol.
INTELLIGENCE	1. Achievement Motivation					
	2. Language Development					
	3. General Learning					
ACHIEVEMENT	4. Achievement Press					
	5. Language Models					
	6. Academic Guidance					
	7. Activeness in the School					
	8. Intellectuality in the School					
	9. Work Habits in the School					